

CLAIMS

1. Device for chemical or biological analysis comprising a carrier containing a plurality of analysis sites able to fix a chemical or biological reagent, in which the analysis sites are formed of microdishes (23, 53) hollowed out of the carrier (21, 51), the side walls and the bottom of the microdishes and the areas of the carrier surface surrounding each microdish, called microdish edges, being made in at least one hydrophilic material (24, 26, 55, 57) and the planar areas of the carrier arranged between the areas surrounding the microdishes being made in a hydrophobic material (27, 59).

2. Device according to claim 1, in which the microdishes have the shape of a flattened cone whose smaller base corresponds to the bottom of the microdish.

3. Device according to claim 1 or 2, in which the side walls, the bottoms and the edges of the microdishes are made in the same hydrophilic material.

4. Device according to claim 1 or 2, in which the bottoms of the microdishes are made in a first hydrophilic material (24, 55), and at least part of the side walls of the microdishes and the edges of the microdishes are made in a second hydrophilic material (26, 57), solely the first hydrophilic material being able to fix the chemical or biological reagent.

5. Device according to any of claims 1 to 4, in which the hydrophilic material(s) contain hydrophilic groups chosen from among the epoxy groups, -OH, -SH, -NH-, -NH<sub>2</sub> and -COOH.

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6. Device according to any of claims 1 to 4, in which the hydrophobic material contains hydrophobic groups chosen from among the hydrocarbon- and fluorocarbon-containing groups.

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7. Device according to claims 4 and 5, in which the first hydrophilic material contains hydrophilic groups different to those of the second hydrophilic material.

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8. Device according to any of claims 1 to 7, in which the carrier comprises an active substrate with an integrated electronic system having electronic functions.

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9. Device according to any of claims 1 to 8, in which the biological reagent is an oligonucleotide.

10. Method for producing a device for chemical  
25 or biological analysis according to claim 3, comprising the following steps:

- a) hollowing out microdishes on the surface of the carrier,
- b) defining the areas of the carrier surface which  
30 are to contain a hydrophobic material, and
- c) forming a hydrophilic material on the areas of the carrier surface and microdishes not containing any hydrophobic material.

11. Method for producing a device for chemical or biological analysis according to claim 3, comprising the following steps:

5       a) hollowing out microdishes on the carrier surface, and

      b) forming a hydrophilic material on the areas of the carrier surface which are to contain a hydrophilic material.

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12. Method for producing a device for chemical or biological analysis according to claim 4, which comprises the following steps:

15      a) hollowing out microdishes on the surface of the carrier,

      b) defining the areas of the carrier surface which are to contain a hydrophobic material,

20      c) defining, on the carrier surface not containing any hydrophobic material and on the surface of the microdishes, first areas corresponding to the sites of the first hydrophilic material and second areas corresponding to the sites of the second hydrophilic material, and

25      d) forming the first hydrophilic material on the first areas and the second hydrophilic material on the second areas.

30      13. Method according to any of claims 10 to 12 comprising an additional step to form a hydrophobic material on the areas of the carrier surface which are to contain a hydrophobic material.

14. Method according to any of claims 10 to 13, in which the microdishes are formed by etching.

15. Method according to any of claims 10 to 13, 5 in which the carrier comprises a surface layer in a polymer or a mineral oxide deposited on an active substrate having an electronic function, and the microdishes are made by etching in the polymer or oxide layer.

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16. Method according to claim 13, in which the carrier being in silicon or in glass, the hydrophobic material is formed by reaction of the glass or silicon, previously subjected to oxidation, with a hydrophobic 15 silanisation agent.

17. Method according to claim 16, in which the hydrophobic silanisation agent is a silane having the formula:



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in which  $R^1$ ,  $R^2$  and  $R^3$ , which may be identical or different, are chosen from among the  $C_1$  to  $C_3$  alcoxy groups and the halogen atoms, and  $R^4$  is a hydrocarbon- 25 or fluorocarbon-containing group, either linear or branched.

18. Method according to any of claims 10 to 13, in which the carrier being in silicon or glass, the hydrophilic material is formed by reaction of the glass 30 or silicon, previously subjected to oxidation, with a hydrophilic silanisation agent.

19. Method according to claim 18, in which the hydrophilic silanisation agent is a silane having the formula:

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in which  $R^1$ ,  $R^2$  and  $R^3$  which may be identical or different, are chosen from among the  $C_1$  to  $C_3$  alcoxy groups and the halogen atoms, and  $R^5$  is a hydrocarbon-  
10 containing group, linear or branched, comprising at least one hydrophilic group chosen from among the epoxy groups,  $-OH$ ,  $-SH$ ,  $-NH_2$  and  $-COOH$ .

20. Method according to claim 13, in which the hydrophobic material is formed by reaction of a  
15 metallic layer in gold, silver, copper or one of their alloys, deposited on the areas of the carrier surface which are to be formed of hydrophobic material, by reaction of this layer with a thiol or a disulfide  
20 containing a hydrophobic hydrocarbon- or fluorocarbon-containing group.

21. Method according to any of claims 10 to 13,  
in which the hydrophilic material is formed by reaction  
25 of a metallic layer in gold, silver, copper or one of their alloys, deposited on the areas of the carrier which are to be formed of the hydrophilic material, by reaction of this layer with a thiol or a disulfide comprising at least one hydrophilic group chosen from  
30 among the epoxy groups,  $-OH$ ,  $-SH$ ,  $-NH$ ,  $-NH_2$  and  $-COOH$ .